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ANTHONY J. BOURGET			EWALD, MARIA VERONICA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/815,475

Applicant(s)

GREGERSON ET AL.

Examiner

MARIA VERONICA D. EWALD

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 30-50 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-21 and 30-50 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 03 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/808)
Paper No(s)/Mail Date 11/7/05
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

13. Applicant's election without traverse of Group I claims (claims 1 – 21 and 30 – 50) in the reply filed on January 22, 2008 is acknowledged.

Claim Objections

14. Claim 8 is objected to because of the following informalities: As written, claim 8 depends on claim 9, but should be corrected to depend on claim 7. Appropriate correction is required.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 30 is rejected under 35 U.S.C. 102(b) as being anticipated by Atake (U.S. 6,325,607). Atake teaches an apparatus for automatically embossing carrier pockets in a continuous strip of plastic material to form a carrier tape by a process including the steps of automatically positioning successive uniform increments of the step between a pair of opposing selectively positionable heating contact surfaces, momentarily contacting the strip with the contact

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surfaces so as to heat a region of the increment to a forming temperature, positioning the increment so that the heated region is between a male mold member and a female mold member, and engaging the region with the male and female mold members to form the pocket, the apparatus including a heat shield assembly adapted to selectively interpose a heat shield between each contact surface and the strip when the process is paused, thereby preventing heat damage to the strip resulting from excessive heat transfer between the contact surfaces and the strip (item 85 – figure 8; column 10, lines 55 – 65).

With respect to claim 30, the Examiner is noting that the phrase “an apparatus....to form the pocket,” which precedes the transitional language “the apparatus including,” is part of the preamble, and is a recitation of intended use. The structural elements which are essential to the claim itself are the element(s) *proceeding* the transitional language, which includes the heat shield. However, to the extent that the preamble is given weight, with respect to understanding the scope of the invention, the Examiner is also noting that the apparatus of Atake is capable of functioning as recited in the preamble, since the apparatus of Atake is a thermoforming machine, with a preheater, and a heat shield, whereby a sheet or strip of plastic material is fed to the preheater and subsequently to the thermoforming machine which includes male and female mold portions. Per MPEP 2111, “during examination, statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the recited purpose or intended use results in a structural difference (or, in the case of process claims, manipulative difference) between the claimed

invention and the prior art. If so, the recitation serves to limit the claim. See, e.g.,
In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims 34, 38, 46, and 49 - 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Atake. Atake teaches an apparatus for automatically embossing carrier pockets in a continuous strip of plastic material to form a carrier tape, the apparatus comprising: means for positioning and guiding the strip in the apparatus (item 50 – figure 2); means for selectively engaging and feeding the strip through the guide structure in a sequence of adjacent uniform increments ((item 60 – figure 2; column 5, lines 10 – 20; column 13, lines 15 – 20); means for heating at least one region on each increment of the strip (item 4 – figure 1; column 4, lines 45 – 50), means for selectively shielding the strip from the heating means (item 85 – figure 8; column 10, lines 55 – 65); and means for molding the heated region into a pocket (items 12 and 25 – figure 1; column 5, lines 55 – 65); wherein the means for molding includes a molding assembly with a male mold (item 25 – figure 1) and a female mold (item 12 – figure 1) arranged to be selectively engageable with opposite sides of the strip at the heated region; wherein there are indexing means for accurately positioning the strip in the guide structure (item 55 – figure 1; column 11, lines 60 – 67); wherein the strip of plastic material is wound on a reel, and further comprising a feed control mechanism to selectively feed the strip to the drive mechanism from the reel (item R – figure 1; column 11, lines 60 – 67; column 12, lines 1 – 20). In the apparatus of Atake, a plastic strip is unwound from the reel (item R – figure 1)

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and fed to the sheet holding mechanism which indexes and moves the sheet forward onto an endless belt and drive assembly (items 50 and 60 – figure 1), which drives the sheet to the molding station. The drive assembly is comprised of pinch chucks which are disengageable from the sheet when the sheet enters the mold. Furthermore, the sheet is clamped within the mold for molding, once disengaged from the drive assembly (column 12, lines 20 – 30). Atake also teaches a control system operatively connected to control the drive, heating, heat shield, and molding assemblies, respectively (column 3, lines 15 – 20; column 4, lines 3 – 5; column 9, lines 45 – 65).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 10 – 12 and 15 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake (U.S. 6,325,607) in view of Fuji (U.S. 5,571,473), and further in view of Mutti, et al. (U.S. 4,778,372). Atake teaches an apparatus for automatically embossing carrier pockets in a continuous strip of plastic material to form a carrier tape, the apparatus comprising: a guide structure for positioning and guiding the strip in the apparatus (item 50 – figure 2); a drive assembly adapted to selectively engage and feed the strip through the guide

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structure in a sequence of uniform increments (item 60 – figure 2; column 5, lines 10 – 20; column 13, lines 15 – 20); a heating assembly (item 4 – figure 1; column 4, lines 45 – 50); a heat shield assembly arranged to selectively interpose a heat shield between the heating assembly and the strip (item 85 – figure 8; column 10, lines 55 – 65); and a molding assembly for molding the heated region into a pocket, the molding assembly including a pair of mold portions (items 12 and 25 – figure 1; column 5, lines 55 – 65) selectively contactable with the at least one pocket region, the pair of mold portions including a male mold portion (item 25 – figure 1) and a corresponding female mold portion (item 12 – figure 1); wherein there is an indexing assembly for accurately positioning the strip in the guide structure (item 55 – figure 1; column 11, lines 60 – 67); wherein the strip of plastic material is wound on a reel, and further comprising a feed control mechanism to selectively feed the strip to the drive mechanism from the reel (item R – figure 1; column 11, lines 60 – 67; column 12, lines 1 – 20). In the apparatus of Atake, a plastic strip is unwound from the reel (item R – figure 1) and fed to the sheet holding mechanism which indexes and moves the sheet forward onto an endless belt and drive assembly (items 50 and 60 – figure 1), which drives the sheet to the molding station. The drive assembly is comprised of pinch chucks which are disengageable from the sheet when the sheet enters the mold. Furthermore, the sheet is clamped within the mold for molding, once disengaged from the drive assembly (column 12, lines 20 – 30). Atake also teaches control system operatively connected to control the drive, heating, heat

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shield, and molding assemblies, respectively (column 3, lines 15 – 20; column 4, lines 3 – 5; column 9, lines 45 – 65).

Atake, however, does not specifically teach that the heating assembly is adapted to heat at least one region on each increment of the strip, the heating assembly including a selectively positionable portion adapted to apply heat to the strip at the at least one region, the portion being positionable in a retracted position spaced apart from the strip. Atake also does not teach the presence of a punching assembly having at least one punch pin arranged to be selectively contactable with the pocket, wherein the punch pin has a shaft with a head portion defined at a distal end thereof, the head having a first cross-sectional dimension, the shaft further having a portion with a second cross sectional dimension adjacent the head portion, the second cross-sectional dimension being less than the first cross-section dimension.

With respect to the heat assembly, it is known, however, to include a retractable heat assembly which moves vertically towards and away from the sheet to heat the sheet on both its top and lower surfaces. For example, in a thermoforming apparatus, Fujii teaches a preheating assembly and a molding assembly for a sheet which is indexed from a reel (figure 1). The preheating assembly is comprised of heating plates (items 32 – 34 – figure 1), which have heating faces directly contacting the parts of the sheet to be formed, without contacting peripheral portions, which are not to be molded (column 3, lines 1 – 10). This suggests a heat assembly with portions adapted to apply heat to the

strip in one region. However, Fujii, like Atake, fails to teach retractable portions. Fujii also fails to teach the inclusion of a punch assembly.

In a thermoforming apparatus, Mutti, et al. teach the use of upper and lower heating plates which may be retractable vertically relative to contacting the sheet (item 1 – figure 1). This adjustment allows a contact pressure with the sheet and occurs via a hydraulic or pneumatic mechanism (column 5, lines 45 – 50). This suggests, retractable portions of the heating assembly, which are adapted to apply heat to the strip in one region. Furthermore, Mutti, et al. teach a punching assembly to punch out the pocket or depression formed. The punch assembly is comprised of a shaft with a head portion defined at a distal end thereof, wherein the cross-sectional dimensions of the shaft are less than that of the head assembly (item 5' – figure 6; column 8, lines 5 – 30).

Thus, Atake teaches a thermoforming apparatus, but without a retractable heating assembly with portions contacting the strip in specific regions. Fujii teaches a thermoforming apparatus, with a heating assembly comprised of protruding plates which contact and heat specific portions of the sheet. Mutti, et al. teach the use of retractable heating plates to ensure thorough heating of the sheet and also teaches the use of a punch assembly to knock-out the individual pockets formed.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the heated contact portions of Fujii, further configured such that the heating assembly is retractable and with a punch assembly, as taught by Mutti, et al. for

the purposes of heating only the portions of the sheet which are to be deformed and for ensuring thorough heating of such portions, while also punching out the individual pockets formed.

Claims 2 – 4 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Fujii, in view of Mutti, et al. and further in view of Arends, et al. (U.S. 5,939,107). Atake, Fujii, and Mutti, et al. teach the characteristics previously described but do not teach that the drive assembly includes a drive roller and a friction roller, wherein the friction roller is selectively positionable and wherein the drive roller is driven by a servomotor. The above references also fail to teach that the guide structure is oriented vertically so that the strip passes through the heating assembly in a generally vertically path. This however, is merely, changing the position of the structural elements but does not change the function of the elements. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (Claims to a hydraulic power press which read on the prior art except with regard to the position of the starting switch were held unpatentable because shifting the position of the starting switch would not have modified the operation of the device); *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975). Furthermore, it is known to one of ordinary skill in the art that a vertical preheater can be used to heat a sheet prior to thermforming.

With respect to the use of the rollers, such means are used to support and move the sheet and are known in the art of thermoforming sheets. For example, in a thermoforming apparatus, Arends teaches the use of opposed pairs of rollers

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to guide and drive a sheet from a reel (item 26 – figure 2). The sheet (item 12 – figure 2) is engaged with pairs of rollers (items 42 and 48 – figure 2), which are disengageable from a sheet-holding position (column 5, lines 1– 15). Furthermore, the drive roller is driven by a servomotor (column 5, lines 35 – 38). Thus, the use of disengageable rollers allows not only the sheet to be clamped between the rollers, but also in the retracted position, allows any corrections to the sheet or threading of the sheet onto the apparatus or reel (column 5, lines 15 – 18). In addition, Arends teaches that the conveyance of the sheet from the reel through the drive rollers and subsequently to the heater occurs in generally a vertical path prior to the thermoforming apparatus. The preheater itself is oriented vertically, while the drive rollers and guide rollers are also oriented vertically with respect to each other, thereby pulling the sheet in the vertical direction.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake, with the elements of Fujii and Mutti, et al., further configured with the rollers and the vertical orientation of the rollers and preheater of Arends, et al. for the purpose of engaging the sheet, thereby moving it through the apparatus and disengaging from the sheet, to allow threading of the sheet onto the reel or any corrections to the apparatus operation.

Claims 5 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Fujii, in view of Mutti, et al. and further in view of Ekendahl, et al. (U.S. 6,659,758). Atake, Fujii, and Mutti, et al. teach the characteristics

previously described but do not teach that the strip of plastic material has at least one series of uniformly spaced sprocket holes, wherein the molding assembly has a plurality of pilot pins adapted to be selectively engageable with the sprocket holes. It is noted, however, that the primary reference of Atake already teach that the sheet is disengageable from the pinch chucks when the sheet is indexed into the mold assembly and clamped therebetween. Thus, Atake is also teaching means within the mold assembly which clamps and holds the sheet in place during molding (item 20 – figure 1; column 12, lines 20 – 30).

In a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

Therefore, the primary reference of Atake teaches a clasper or clamping means which engages the sheet in the molding apparatus. Ekendahl teaches a variety of gripping and transferring means such as pins gripping the sheet on both sides or the use of mechanical frames which register with holes in the plastic sheet. Though Atake may not teach the specific clamping means, Ekendahl already teaches a plastic sheet with holes to register with a mechanical

frame of which such an assembly functions as that as claimed by Applicant. Such an assembly serves the purpose of clamping the sheet and conveying it through the molding apparatus.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the structural elements of Fujii and Mutti, et al., further configured with the gripping structure of Ekendahl, comprised of a mechanical frame assembly corresponding to holes in the sheet for the purpose of gripping and transferring the sheet through the molding apparatus.

Claims 7 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Fujii, in view of Mutti, et al. and further in view of Desnick (U.S. 3,642,411). Atake, Fujii and Mutti, et al. teach the characteristics previously described but do not teach that the heat shield assembly includes a body portion and a pair of spaced apart shield plate portions projecting therefrom, the shield plate portions adapted to be selectively positionable so that each shield member is disposed between the strip and a separate contact portion of the heating assembly, wherein the heat shield includes a pair of air diffusers in the body portion, each diffuser positioned so as to direct air onto a surface of a separate one of the shield plate portions.

In a thermoforming apparatus, Desnick teaches the use of heat shield members (items 115 and 116 – figure 8), which cover upper and lower portions of the sheet which are not be contacted or molded. The heat shield members

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further include passages to cool the heat shield members (column 6, lines 40 – 50), such that cooling fluid is circulated through the passages.

The primary reference of Atake already teaches the use of a heat shield, while both Fujii and Mutti, et al. teach upper and lower heating assemblies. It is noted that the heat shield of Atake is movable between a retracted position and a forward position, wherein in the forward position, the shield prevents the sheet from further heating, should the apparatus operation be ceased, thereby preventing any warpage of the sheet (column 10, lines 50 – 65). Desnick teaches upper and lower heat shield assemblies which can be cooled via circulating fluid through its passages. Thus, because Atake already teach the use of a heat shield and both Fujii and Mutti, et al. teach upper and lower heating plates, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake, with the elements of both Fujii and Mutti, et al., further modified with the upper and lower heat shield plates of Desnick for the purpose of preventing any temperature increase in the sheet which may cause sheet warpage, should the apparatus operation be discontinued.

Claim 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Fujii, in view of Mutti, et al. and further in view of Dupraz (U.S. 5,437,546). Atake, Fujii and Mutti, et al. teach the characteristics previously described but do not teach the presence of an air curtain as a heat shield. The use of an air curtain is merely to cool the sheet and deter any increased

temperature rise, which may cause warpage of the sheet. Thus, it would have been obvious to implement an air curtain as the shield.

For example, in an apparatus to cool an extruded film or foil, Dupraz teaches the use of an air curtain which is discharged from a slit of a tubular body (column 4, lines 50 – 60). The use of the air curtain and the control of the air flow deters any curling of the sheet (column 5, lines 50 – 54). Thus, the quality of the sheet is maintained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the elements of Fujii and Mutti, et al. with the air curtain of Dupraz for the purpose of preventing any warpage of the sheet and maintaining its quality.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Fujii, in view of Mutti, et al. further in view of Ekendahl and Wheaton, III, et al. (U.S. 3,706,517). Atake, Fujii, and Mutti, et al. teach the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a ball detent mechanism. As noted previously, Atake already teaches an indexing means for moving the sheet and the use of a ball detent mechanism corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be

comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

In addition, in a rotating turret used to transfer work pieces between stations, Wheaton, III, et al. teach the use of a rotating crank arm (item 78 – figure 2), to which a flag (item 76 – figure 2) is attached. The flag is rotated and firmly seated on the crank arm via a ball detent and spring mechanism (item 140 – figure 8). The ball detent and spring mechanism ensures the flag member is held securely during rotation and indexing. Furthermore, the crank arm and flag are indexed from one position to another to engage the turret head, thereby indexing it from one station to another. In the apparatus of Wheaton, III, et al., the turret is indexed in an injection blow molding machine with three or more work stations, wherein the preforms are first formed and subsequently processed (column 2, lines 15 – 20).

Thus, Atake, Fujii, and Mutti, et al. teach thermoforming apparatus, wherein a plastic sheet is conveyed through a series of stations. Atake also teaches that there are indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames.

In a rotating turret, Wheaton, III, et al. teach indexing means wherein a flag is secured to a rotating crank arm, causing the turret to index from one station to another, wherein the flag is secured to the crank arm via a ball detent mechanism. Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the elements of Fujii, Mutti, et al., and Ekendahl, further configured with the ball detent mechanism of Wheaton, III, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Fujii, in view of Mutti, et al. further in view of Ekendahl and Oster, et al. (U.S. 6,380,549). Atake, Fujii, and Mutti, et al. teach the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a light sensor to register the sprocket holes. As noted previously, Atake already teaches an indexing means for moving the sheet and the use of a light sensor corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill in the art.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a

chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

With respect to the use of light sensor, Oster, et al. teach the use of a light sensor to detect pin-holes in foils, such that the light sensor is aligned with the holes.

Thus, Atake, Fujii, and Mutti, et al. teach thermoforming apparatus, wherein a plastic sheet is conveyed through a series of stations. Atake also teach that there are indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames. Oster, et al. teach the use of a light sensor which registers or detects pin holes in foils. Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the elements of Fujii, Mutti, et al., and Ekendahl, further configured with the light sensor of Oster, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claims 17 – 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Fujii, in view of Mutti, et al. further in view of Straumanis (U.S. 3,904,338). Atake, Fujii, and Mutti, et al. teach the characteristics previously described but do not teach the specific control system as claimed, wherein there is an automatic operating mode and a pause mode.

In a method to control thermoforming of an extruded sheet, Straumanis teaches the use of a control system and sensors which monitor the thermoforming operation and control the conveyance of the sheet to the thermoformer, such that in an intermittent mode, an accumulator is used to take up the slack, such that the extruded sheet is not warping or becoming damaged if it sags, while waiting to be conveyed to the thermoformer (column 2, lines 50 – 65). The thermoforming apparatus of Straumanis includes an intermittent-activated process, wherein the sheet is indexed through the preheater and subsequently to the mold (column 5, lines 40 – 50). The control system of Straumanis incorporates the use of sensors and a dancer roll (item 23 – figure 23), which synchronizes the indexing of the sheet to the thermoformer from the extruder, such that the sheet is adequately fed to the thermoformer without sacrificing throughput and damage to the sheet, should operation stop or slow down (column 6, lines 6 – 50). Thus, the control system of Straumanis suggests a control system functioning like that of Applicant, wherein the control system defines a normal automatic mode and a selectable pause mode, wherein the strip is held stationary, the portion is positioned in the retracted position and the heat shield is positioned between the portions and the strip, wherein there is a

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synchronizing assembly arranged to receive embossed carrier tape from the apparatus, the synchronizing assembly including a pair of sensors, a first sensor of said pair being arranged to generate a signal when the amount of carrier tape present in the synchronizing assembly is in excess of a first predetermined amount and a second sensor of said pair being arranged to generate a signal when the amount of carrier tape present in the synchronizing assembly is less than a second predetermined amount, wherein each of the pair of sensors is operably connected with the control system, and wherein the control system is adapted to automatically initiate the pause mode when the amount of carrier tape present in the synchronizing assembly is in excess of the first predetermined amount and to automatically initiate the normal automatic operating mode when the amount of carrier tape present in the synchronizing assembly is less than a second predetermined amount.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the elements of Fujii and Mutti, et al., further configured with the control system of Straumanis for the purpose of effectively conveying the strip or sheet through the preheater and molding stations, such that any pause in the operation, is registered by the apparatus and varies the speed or slack of the sheet, such that any portion of the sheet not yet molded, is not warped or damaged at any point in the operation.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Fujii, in view of Mutti, et al. and further in view of Fritz, et al. (U.S.6,257,866). Atake, Fujii, and Mutti, et al. teach the characteristics previously described but do not specifically teach that the female mold portion has an opening defined therein, the opening selectively operably connected with a supply of compressed gas, and wherein a stream of compressed gas is selectively directed from the opening against the strip to urge the strip against the male mold. However, the use of compressed gas is known to one of ordinary skill in the art of thermoforming, whether used to expel gas onto the sheet surface to urge it against the mold or used as a vacuum to hold the sheet against a mold surface.

For example, in a thermoforming apparatus, Fritz, et al. teach the use of a upper and lower platens (items 16 and 18 – figure 1), in which both platens have vacuum and air pressure sources connected to them urging the sheet against the mold form (item 14 – figure 1). Initially, the plastic sheet is heated to its pliant state, allowing it to be molded. To ensure it does not sag, a vacuum source is operated to maintain the sheet against the heating plate (item 50 – figure 1). Subsequently, the air pressure source is activated to urge the sheet against the bottom platen and thereby against the mold (column 4, lines 25 – 40, 45 – 55). Thus, the use of the air flow ensures that the sheet is pressed firmly against the mold form and adequately shaped.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake with the

elements of Fujii and Mutti, et al., further configured with the air pressure source of Fritz, et al. for the purpose of ensuring that the sheet is firmly pressed against the mold form and thus, adequately shaped.

Claims 31 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Desnick. Atake teaches the characteristics previously described but do not teach that the heat shield assembly includes a body portion and a pair of spaced apart shield plate portions projecting therefrom, the shield plate portions adapted to be selectively positionable so that each shield member is disposed between the strip and a separate contact portion of the heating assembly, wherein the heat shield includes a pair of air diffusers in the body portion, each diffuser positioned so as to direct air onto a surface of a separate one of the shield plate portions.

In a thermoforming apparatus, Desnick teaches the use of heat shield members (items 115 and 116 – figure 8), which cover upper and lower portions of the sheet which are not be contacted or molded. The heat shield members further include passages to cool the heat shield members (column 6, lines 40 – 50), such that cooling fluid is circulated through the passages.

The primary reference of Atake already teaches the use of a heat shield. It is noted that the heat shield of Atake is movable between a retracted position and a forward position, wherein in the forward position, the shield prevents the sheet from further heating should the apparatus operation be ceased, thereby preventing any warpage of the sheet (column 10, lines 50 – 65). Desnick teaches

upper and lower heat shield assemblies which can be cooled via circulating fluid through its passages. Thus, because Atake already teach the use of a heat shield, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake, further modified with the upper and lower heat shield plates of Desnick for the purpose of preventing any temperature increase in the sheet which may cause sheet warpage, should the apparatus operation is discontinued.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Dupraz. Atake teaches the characteristics previously described but do not teach the presence of an air curtain as a heat shield. The use of an air curtain is merely to cool the sheet and deter any increased temperature rise, which may cause warpage of the sheet. Thus, it would have been obvious to implement an air curtain as the shield.

For example, in an apparatus to cool an extruded film or foil, Dupraz teaches the use of an air curtain which is discharged from a slit of a tubular body (column 4, lines 50 – 60). The use of the air curtain and the control of the air flow deters any curling of the sheet (column 5, lines 50 – 54). Thus, the quality of the sheet is maintained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the air curtain of Dupraz for the purpose of preventing any warpage of the sheet and maintaining its quality.

Claims 35 – 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Arends, et al. Atake teaches the characteristics previously described but do not teach that the drive assembly includes a drive roller and a friction roller, wherein the friction roller is selectively positionable and wherein the drive roller is driven by a servomotor.

With respect to the use of the rollers, such means are used to support and move the sheet and are known in the art of thermoforming sheets. For example, in a thermoforming apparatus, Arends teaches the use of opposed pairs of rollers to guide and drive a sheet from a reel (item 26 – figure 2). The sheet (item 12 – figure 2) is engaged with pairs of rollers (items 42 and 48 – figure 2), which are disengageable from a sheet-holding position (column 5, lines 1– 15). Furthermore, the drive roller is driven by a servomotor (column 5, lines 35 – 38). Thus, the use of disengageable rollers allows not only the sheet to be clamped between the rollers, but also in the retracted position, allows any corrections to the sheet or threading of the sheet onto the apparatus or reel (column 5, lines 15 – 18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake, with the the rollers of Arends, et al. for the purpose of engaging the sheet, thereby moving it through the apparatus and disengaging from the sheet, to allow threading of the sheet onto the reel or any corrections to the apparatus operation.

Claims 39 – 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Ekendahl, et al. Atake teaches the characteristics previously described but do not teach that the strip of plastic material has at least one series of uniformly spaced sprocket holes, wherein the molding assembly has a plurality of pilot pins adapted to be selectively engageable with the sprocket holes. It is noted, however, that the primary reference of Atake already teach that the sheet is disengageable from the pinch chucks when the sheet is indexed into the mold assembly and clamped therebetween. Thus, Atake is also teaching means within the mold assembly which clamps and holds the sheet in place during molding (item 20 – figure 1; column 12, lines 20 – 30).

In a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

Therefore, the primary reference of Atake teaches a clamper or clamping means which engages the sheet in the molding apparatus. Ekendahl teaches a variety of gripping and transferring means such as pins gripping the sheet on both sides or the use of mechanical frames which register with holes in the

plastic sheet. Though Atake may not teach the specific clamping means, Ekendahl already teaches a plastic sheet with holes to register with a mechanical frame of which such an assembly functions as that as claimed by Applicant. Such an assembly serves the purpose of clamping the sheet and conveying it through the molding apparatus.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the gripping structure of Ekendahl, comprised of a mechanical frame assembly corresponding to holes in the sheet for the purpose of gripping and transferring the sheet through the molding apparatus.

Claim 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Fritz, et al. Atake teaches the characteristics previously described but does not teach that the female mold portion has an opening defined therein, the opening selectively operably connected with a supply of compressed gas, and wherein a stream of compressed gas is selectively directed from the opening against the strip to urge the strip against the male mold. However, the use of compressed gas is known to one of ordinary skill in the art of thermoforming, whether used to expel gas onto the sheet surface to urge it against the mold or used as a vacuum to hold the sheet against a mold surface.

For example, in a thermoforming apparatus, Fritz, et al. teach the use of a upper and lower platens (items 16 and 18 – figure 1), in which both platens have vacuum and air pressure sources connected to them urging the sheet against the

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mold form (item 14 – figure 1). Initially, the plastic sheet is heated to its pliant state, allowing it to be molded. To ensure it does not sag, a vacuum source is operated to maintain the sheet against the heating plate (item 50 – figure 1). Subsequently, the air pressure source is activated to urge the sheet against the bottom platen and thereby against the mold (column 4, lines 25 – 40, 45 – 55). Thus, the use of the air flow ensures that the sheet is pressed firmly against the mold form and shaped adequately.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake with the air pressure source of Fritz, et al. for the purpose of ensuring that the sheet is firmly pressed against the mold form and thus, adequately shaped.

Claim 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Desnick. Atake teaches the characteristics previously described but do not teach that the heat shield assembly includes a body portion and a pair of spaced apart shield plate portions projecting therefrom, the shield plate portions adapted to be selectively positionable so that each shield member is disposed between the strip and the heating means

In a thermoforming apparatus, Desnick teaches the use of heat shield members (items 115 and 116 – figure 8), which cover upper and lower portions of the sheet which are not be contacted or molded. The heat shield members further include passages to cool the heat shield members (column 6, lines 40 – 50), such that cooling fluid is circulated through the passages.

The primary reference of Atake already teaches the use of a heat shield. It is noted that the heat shield of Atake is movable between a retracted position and a forward position, wherein in the forward position, the shield prevents the sheet from further heating should the apparatus operation be ceased, thereby preventing any warpage of the sheet (column 10, lines 50 – 65). Desnick teaches upper and lower heat shield assemblies which can be cooled via circulating fluid through its passages. Thus, because Atake already teach the use of a heat shield, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Atake, further modified with the upper and lower heat shield plates of Desnick for the purpose of preventing any temperature increase in the sheet which may cause sheet warpage, should the apparatus operation is discontinued.

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Dupraz. Atake teaches the characteristics previously described but do not teach the presence of an air curtain as a heat shield. The use of an air curtain is merely to cool the sheet and deter any increased temperature rise, which may cause warpage of the sheet. Thus, it would have been obvious to implement an air curtain as the shield.

For example, in an apparatus to cool an extruded film or foil, Dupraz teaches the use of an air curtain which is discharged from a slit of a tubular body (column 4, lines 50 – 60). The use of the air curtain and the control of the air flow

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deters any curling of the sheet (column 5, lines 50 – 54). Thus, the quality of the sheet is maintained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the air curtain of Dupraz for the purpose of preventing any warpage of the sheet and maintaining its quality.

Claims 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Mutti, et al. Atake teaches the characteristics previously described but do not teach the presence of a punch pin and the elements of the punch pin.

In a thermoforming apparatus, Mutti, et al. teach a punching assembly to punch out the pocket or depression formed. The punch assembly is comprised of a shaft with a head portion defined at a distal end thereof, wherein the cross-sectional dimensions of the shaft are less than that of the head assembly (item 5' – figure 6; column 8, lines 5 – 30).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the punch assembly, as taught by Mutti, et al. for the purpose punching out the individual pockets formed.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake, in view of Ekendahl and further in view of Wheaton, III, et al. Atake

teaches the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a ball detent mechanism. As noted previously, Atake already teaches an indexing means for moving the sheet and the use of a ball detent mechanism corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

In a rotating turret used to transfer work pieces between stations, Wheaton, III, et al. teach the use of a rotating crank arm (item 78 – figure 2), to which a flag (item 76 – figure 2) is attached. The flag is rotated and firmly seated on the crank arm via a ball detent and spring mechanism (item 140 – figure 8). The ball detent and spring mechanism ensures the flag member is held securely during rotation and indexing. Furthermore, the crank arm and flag are indexed from one position to another to engage the turret head, thereby indexing it from one station to another. In the apparatus of Wheaton, III, et al., the turret is

indexed in an injection blow molding machine with three or more work stations, wherein the preforms are first formed and subsequently processed (column 2, lines 15 – 20).

Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake with the holes and frame configuration of Ekendahl further configured with the ball detent mechanism of Wheaton, III, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atake in view of Dupraz and further in view of Ekendahl and Oster, et al. Atake and Dupraz teaches the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a light sensor to register the sprocket holes. As noted previously, Atake already teaches an indexing means for moving the sheet and the use of a light sensor corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the

sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

With respect to the use of light sensor, Oster, et al. teach the use of a light sensor to detect pin-holes in foils, such that the light sensor is aligned with the holes.

Thus, Atake already teaches indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames. Oster, et al. teach the use of a light sensor which registers or detects pin holes in foils. Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Atake, configured with the air curtain of Dupraz, further configured with the hole and mechanical frame configuration of Ekendahl, further configured with the light sensor of Oster, et al. for the purpose of conveying and indexing the sheet through the work stations.

Information Disclosure Statement

17. The prior art made of record, not relied upon, is deemed pertinent to the state of the art and thus, has been considered.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA VERONICA D. EWALD whose telephone number is (571)272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MVE

/Maria Veronica D Ewald/

Examiner, Art Unit 1791